TRANSURBANISM

A STUDY OF

THE EMERGING GLOBAL NETWORK OF INTERNATIONAL CITIES

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TRANSURBANIZATION
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THEMATIC OUTLINE

1. DIAGNOSIS: Present Situation Identification & Condition Definition
Standards; Symptoms; Indices; Phenomena; Data

1.1. SEMIOLOGY: Thesis: System Transformation Dynamics.
Criteria: Interstructures; Interconnections; Interactions.

1.2. ACTUALITY: Transurbanism: Wealth-power-people
Development of Global Network of Urban Centers.

1.3. TAXONOMY: INCs: Classification of International Cities;
Global-Regional-Local; Political-Economic-Cultural.

2. ANAGNOSIS: Past Chain of events; Cause-Effect; Civilization.
Social Evolution; Historical Development; Progress.

2.1. ETIOLOGY: Modernization-Industrialization Hypothesis:
Evolutionary Development; strange urban attractor.

2.2. HISTORY: EGO: Nation-States under opposing pressures
from above (supranational) & below (infranational).

2.3. THEORY: Macrohistorical-Megapolitical Geosocial Systems.
Post-Modernism & C3 Nerve Center-Networks.

3. PROGNOSIS: Meturban Outcomes; Conditional developments.
Social Forecasting; Chaos & Cosmos.

3.1. MELONTOLOGY: Possible & Probable; Projections & Trends;
Extrapolations & Cycles; Determinism & Volunterism.

3.2. TENDENCY: Internationalization; Multinationalization; NICE.
Transnationalization; Urbanization; Technopolization.

3.3. PPOPHECY: Alternative Scenaria: Pessimistic; Optimistic;
Realistic: Global Village; Dual City; City-State.

INTRODUCTION

This study takes a systematic look into the recent transurban phenomenon reflected in a global network of metropolitan centers. Defined as the process by which localized human settlements increase and strengthen their transborder actions and connections; transurbanization seems to be a significant aspect of world evolution. Indeed, our basic hypothesis is that developing a Trans-Urban Network (TUN) of Inter-National Cities (INCs) is a crucial aspect of an Emerging Global Order (EGO) in which national borders are of decreasing importance.

Consequently, the questions posed here are: what is this phenomenon, why has it evolved, and where it may lead? The relevance of this inquiry is evident by the impact of urbanization on both culture and nature. Beyond urbanism lies transurbanism, wherein a plethora of INCs get tied together into a single TUN, independently of their nation-states. It is this global network that characterizes to a large extent the global system dynamics in the New International Cities Era (NICE).

From this viewpoint, it is incontestable that the world is rapidly trans-urbanizing and not merely urbanizing. Presently, its growing urban population -almost half of humanity- is becoming increasingly interconnective and inter-active. This situation creates serious problems, at the same time as if opens new opportunities. In any case, it offers an interesting case for academic study as well as a challenging issue for public policy.

We hereby note the great potential of this phenomenon and will treat it accordingly. To do so, the content is divided into its conceptual, perceptual, and operational aspects. On that basis, the method follows a diagnostic-anagnostic-prognostic algorithm. Together, these two parameters form the accompanying schematic matrix which serves both as a synoptic per-spective and a table of contents for this study.

Accordingly, the paper is divided into three chapters dealing with the corresponding steps of the above analytic sequence. Each of the chapters is itself divided into three sections covering its substantive scope. Although, the necessary comparative data for a complete quantitative analysis is inadequate, enough sectoral information is available to justify an exemplary case study.

As a result, we have undertaken a survey of the international transurban airlanes (ITA) connecting INCs by providing channels through which people (energy), freight (matter) and mail (information) flow around the world. Because of their growing importance, ITA connections provide the best International City Index (ICI) for TUN. Therefore, each chapter is completed by running through the ITA case study in its three methodological (diagnistic-anagnostic-prognostic) phases.

1. DIAGNOSIS

To begin with, we conduct a social diagnosis of the general condition of the planetary ecosystem, because it underlies any subsequent analysis of its specific situation. As proposed by Duncan, the ecological complex may be studied within the so-called POET (Population-Organization-Environment-Technology) parameters. Accordingly, we adapt and adopt an ASE (anthropological-sociological-ecological) framework to diagnose the current human condition as it relates to transurban life.

The Earth's shell may be divided into its biosphere and sociosphere. The former envelops the surface of the planet (500 mil. sq. km., 70% water), since there is life to be found everywhere on Earth. The latter is much smaller and includes only those parts which humanity has shaped and transformed from a state of nature into culture. At present, about half of the land (75 ml.sq.km) has been brought into the domesticated domain, the other half is still in its wild natural state as uninhabited waste, mountain, desert, tundra, or swamp.

The sociosphere is divided territorially into rural and urban. The rural portion is by far the largest (>99%), of which 35 million square kilometers is forest, 20 ml.sq.km is pasture, and 15 m.s.k. is farm land. The remaining 5 msk has various uses including the human habitats (1 msk). By this calculation, the sociosphere extends to 50% of the Earth's land surface, from partial usage (forest+pasture: 40%) to complete utilization (homoculture+agriculture:10%), averaging 30% (45 msk).

This means that the over two billion urban population of the world is fed by cultivating less than one billion hectares of farm land. This organic, as well as inorganic, energy is generated in the countryside surrounding urban settlements. Thus, most of the world's energy (10 billion kce) is produced outside and consumed inside large cities.

Besides energy, there is an increasing flow of people and materials from the rural to the urban domain, as a result of which the latter is expanding while the former is contracting. Most significant, a growing number of cities become tightly interconnected within the global system of economic, political, and cultural activities in a NICE.

On the basis of this broad background, it is possible to concentrate on the anatomy of the transurban domain. To do so, we first present the symbolic foundations of our conceptual model; then, discern the salient data which measure the transurban phenomena of the present juncture; and finally draw the appropriate conclusions by making a comparative classification of INCs, thus putting the whole picture into its proper perspective.

1.1. SEMIOLOGY

The conceptualization here sets out the framework within which a diagnosis can be performed. In so doing, it makes explicit any implicit assumptions which underlie perceptions. Among them are the definition of terms and basic axioms upon which this argument is based.

Let us start by identifying the acronym TUGS (Trans-Urban Global System) as the focus of our concerns. Following systems theory, we first define its static (structures) and dynamic (functions) features. Structure has already been mentioned as the sinews of TUN forming the core of TUGS, whose principal elements are the municipal institutions

of geopolitical entities. As to functions, they form the transportation and communication channels connecting these city nodes.

Due to the complexity of the global system, our network analysis rests on a systemic conceptual framework. The taxonomy of such model is provided by the Triadic Paradigm of Sociophysics, whose parameters are:
-Spatial: geographical structure: local-regional-global levels.
-Temporal: historical development: past-present-future evolution.
-Existential: thematic reality: natural-social-human behavior.

The spatial parameter provides the relatively static or structural elements of the system, whose normal pattern is basically fractal and may be described in two dimensions: Horizontal Geographic Areas (circle of centre-core or margin-periphery); and Vertical Hierarchical Levels (pyramid of global-regional-local institutions). Either way, cities form the nodes of intersecting transport-communication channels in a few repeated patterns of various sizes, measured by two indices: Sociospace (ratio of social use relative to the total land) and Sociomotion (social traffic equals the movement of humans plus their artifacts and possessions).

The temporal parameter provides the dynamic aspects of the system as recorded in history. A historical measure may be provided by Sociotime (social change=dH+dA+dP/dt), as an index of historical development.

Finally, the existential parameter provides an ekistic theory based on
-Ecology: topology, security, natural carrying capacity (Physis);
-Sociology: kingship, kinship, interpersonal relationships (Polis);
-Psychology: mentality, individuality, human personality (Anthropos).

Since we are here particularly interested in the social aspects of life, the focus is on the social system, as measured by:
-Sociomass: Social matter=Humans+Artifacts+Possessions(weight in Tons).
-Socioenergy: Social activity=H+A+P. (Energy consumption in Kwatts).
-Socioinformation: Social Communication= H+A+P(data transmitted bits).

All these indices may be estimated for urban areas. Their combination gives significant data for social density (sociomass / sociospace)and social development (sociomotion+ socioenergy+ socinformation /sociomass).
Of course, carrying out such measurement is beyond our scope here; so we leave it at that and turn to the application of sociophysics to metropolitics.

1.2. ACTUALITY

In order to determine the transurban condition of the world, some index of urbanization, provided by the ratio of urban/rural population is necessary. Every inhabited geographical region consists in several islands of urban agglomeration in the midst of a sea of rural hinterland. The population ratio between a core and its periphery is significant because it indicates the degree of an area's urbanization. Presently, the world is reaching a ratio of about 1:1, thus it may be said that the world is semi-urbanized.

Cities may be seen as command-control-communication (C3) nodes of the world system. These urban foci of high social activity exchange matter (goods); energy (services); and information (news), thus forming centers of gravity or salient points of capital accumulation, resource allocation and decision-making.

By the UN definition of a city as merely an agglomeration of more than 20,000 people, there are many thousands of such entities in the

world, most of which are semi-isolated inhabited locales of little importance. So, for our purposes here, we have to raise the threshold of urbanhood at least tenfold. Even then, there are over 2,500 cities of 200,000 or more people in the world. Most of them are in North America and Asia (750 each), then Europe (600), Africa and Latin America (200 each), and finally Oceania (50). Of these, only 150 cities have over 1 million people, 100 have over 2 million, 50 over 5 million, 20 over 10 million and only 5 over 15 million.

If urbanization is the tendency for increasing percentages of a country's population to inhabit relatively small areas, then North America and Western Europe at 85% are the most urbanized continents in the world, whereas Africa and Asia with 15% are the least. The urbanization of countries range from almost 100% urban city-states (Singapore and Hong Kong), 90% (Belgium; Taiwan; Israel; Holland, England); 80% (Denmark; Germany; Spain; Japan); and 75% (USA; Canada; U.K.; France; Italy). At the other extreme, the most rural countries range from almost 100% (Burundi); 90% (Ethiopia); 75% (China; Thailand; Kenya; India).

More important than seer ratios or numbers is the quality of human life in cities. Q of L indicates the level of activity, creativity and productivity, as well as organization, distribution and consumption patterns. In this respect, perhaps the most significant QoL index is where and how the production and consumption of matter, energy and information is distributed.

Human organism burn energy at the rate of 100 watts (25 calories /second). In addition, non-human energy may double this amount in primitive societies. In overdeveloped systems (e.g. USA) this amount is increased a hundredfold, so that the average American burns energy at 10 kw rate (compared to Canadian's 13 kw and African's 1 kw), most of which is commercial and urban. World-wide, 5 billion people at an average of 3 kw each burn 15 Terawatts or 4 trillion calories/second. It is significant, as already mentioned, that most of this power is produced outside cities, whereas it is consumed inside them.

By its high energy throughput, urban labor is exclusively engaged in the secondary and tertiary sectors of the economy. The distribution of the world's labor force (2 billion in 1990) is in: primary (40%); secondary (30%); and tertiary (30%) sectors. The labor distribution of the Post-Industrial World, however is more skewed: primary <10%, secondary <30%, tertiary >60%. So urbanization correlates with industrialization and modernization.

Nevertheless, of particular interest here is not what happens within cities but between them. The quantity and quality of transurban relations and interactions are here more important than their internal activities.

From this perspective, we note materialistic, energetic, or informatic activities flowing via a complex network of inter-city channels. Materials are transported along land roads, waterways, and air lanes. Energy is transmitted through pipelines or cables. Finally, information is communicated by wires or waves. As transurban activities increase, so their connections strengthen; structures and functions thus grow apace.

As centers of action, cities are interconnected, both with other cities within the same country and with foreign cities throughout the world. Domestic connections are traditionally by land, so modern cities are nodes of railway traffic. Most (65%) of this traffic occurs in Asia (China, India, Russia) followed by North America (25%) and Europe (10%). The total rail freight traffic in the world is over seven

trillion ton-kms. Compared to that, air freight is miniscule (only 40 billion ton-km).

Yet. most of long distance human movement is by air due to tourism which is already one of the world's largest industries, accounting for 10% of the GWP ($2 out of $20 trillion). Of this, international tourism accounts for 10% or $200 billion (excluding travel) generated by 400 million travelers.

The world's top tourist spots are cities headed by the USA which hosted almost 10% (35 million) of foreign tourism, generating 15% ($30 billion) of its value. Spain, France and Italy follow with 35 million tourists, but only $15 billion each, then Britain and Germany with 15 million and $10 billion each. According to the World Tourist Organization, these people stay in the ten million appropriate hotel rooms around the world. Of these half are in European and a third in North American cities.

In addition to transportation, communication is another important index of connectivity. The hundred languages of the world, spoken by more than 5 million people each, serve 99% of the world's population. Each of these languages is spoken in at least one major city, with English being the lingua franca among them.

World cities publish a million book titles and four thousand films annually. In addition, over a hundred news agencies write almost fifty million words and ten thousand newspapers print over than half a billion copies daily. Almost a hundred thousand broadcasting stations transmit to a billion viewers and two billion listeners, but only a hundred radio stations have exclusively international programs. Almost a billion telephones communicate point-to-point information via a hundred satellites and hundred thousands of cable miles. Several million of computers process and store all this information in the world's urban centers.

According to UNESCO, the world information-communication economy, like tourism, also accounts for 10% of the GWP ($2/$20 trillion), although it is over a third in advanced economies. In the US, for example, it is a quarter of the total GWP, but contributes half of its i-c portion, thus indicating its leading post-industrial stage. As a result, 90% of the world's computer and telecommunications network serves only 10% of the world's urban centers. Half of the GNP and a quarter of the trade of the world's 15 top post-industrial states comes from their tertiary sector, of which information is the most important component.

Moreover, unlike matter or energy, most data and services are produced and consumed in cities. By now, transborder data flows have increased to the point constituting a significant component of international traffic. This inter-city traffic, utilizing cable or satellite transmission, is mostly in the First North-Western world. Of the 200 geocynchronous satellites, only 20 serve the Third World cities. Of the almost half-billion telephone lines in the world, 80% serve the North's ten top countries with 20% of the world's population (the US alone has 25% of the world's telephones, as it has GNP). Two major routes (trans-Atlantic: 60% & trans-Pacific 20%) account for most of the world's telephone traffic between the global cities of North America, Europe and Far East. These are in addition to the world's mail traffic, of which the US generates 10% (1/10 billion letters annually).

Even money is now transferred between INCs as bits of information. Electronic fund transfers taking place among the main financial centers of the world have now reached 2/3 of the GWP ($10/$15 Trillion).

The principal institutions responsible for this massive production and distribution of matter, energy, and information throughout the world are the Trans-National Corporations (TNCs). According to the UN, there are 35,000 of them with 150,000 affiliates throughout the world. Of these 30,000, with their 75,000 branches, originate in the First World, thus leaving only 5,000 and their affiliates for the rest. In the mid-eighties, of the 600 largest TNCs, 50% were American, 25% European, 15% Japanese, and 5% for the rest of the OECD countries. The top 250 TNC Head Offices were situated in ten cities: NY (60), London (40), Tokyo (35), Paris (25), Chicago (20), Essen (20), Osaka (15), L.A. (15), Houston (10), Hamburg (10).

Perhaps the most important TNCs are in the banking and financial fields. By the mid-eighties, the world's 100 largest banks had 5000 foreign branches. Of these, 25 (7 of the top 10) were Japanese with 40% of the total assets, 40 were European with 40% of the assets, 15 American with 10% assets, leaving 10 for the rest of the OECD and another 10 for the LDC's. According to the Wall Street Journal the top financial centers of the world in the mid-eighties were: Tokyo, New York, London, Paris, and Frankfurt. Of the top cities, London had 400 and NY 300 foreign banks represented there.

Stock Market cities followed a similar hierarchy. The center of global capital, the NYSE listed 2000 corporations, worth $6 trillion, and did $6 trillion transactions in 1995. The equivalent figures for Tokyo were: 1750; $2; $1.5. London: 2000; $1.5; $2. Frankfurt: 700; $0.5; $1; showed the four financial foci of the world. Therein the top 25 brokerage firms, a dozen were American, ten Japanese and only two European, exchanged most of the world shares.

Financial institutions situated in the main INCs determine economic activity in entire countries, if not continents. These banks of the North-Western Triad (USA-EC-Japan) account for 75% of the world's FDI (foreign direct investment), totaling two trillion dollar FDI stock, of which $500 billion flow among them and $200 billion to the rest of the world per year. Most of this is trans-Atlantic ($270 b from EC to NA; $180 from NA to EC).

In addition to the private sector, public institutions also contribute to the TUN. Most international relations are carried out in the traditional bi-lateral way and are thus directed from one city to another. The US, along with the UK, has the widest range of diplomatic relations, represented in about 200 cities around the world. (i.e. 150 embassies; 10 missions; 70 consulates general; 25 consulates; 25 consular agencies, in 175 countries.

More modern multilateral diplomacy is centered in International Public Organizations which operate from urban centers. A few great cities serve as the headquarters of the thousands of IPOs in actual operation. In this function, the top ten INCs are headed by Paris and Brussels with almost 900 Headquarters each, followed by London with 500, Rome and Geneva with over 400 each, New York with 250, and Washington, Vienna, Stockholm, Copenhagen with over 100 each. There follow another 100 INCs, all of which have at least one head office.

In addition to their permanent activities, IPOs organize periodic international conferences which bring together officials or professionals for multilateral consultations or negotiations. Great cities are the favorite venues for these events. Most of these are held annually in these top ten cities: Paris 360, London 260, Geneva 180, Brussels 160, Madrid 120, Vienna 110, Berlin 100, Singapore 100, Barcelona 90, and Amsterdam 80. It is evident from these figures that an urban center which cannot host international events can hardly be

considered an INC.

Even on a lower City Hall level, INCs are related by mondialization projects or International Sister Cities programs which twin municipalities across borders. There are now thousands of such sister cities all over the world, building goodwill bridges via primarily cultural exchanges.

Furthermore, groups of cities in different parts of the world form networks in distinct ways to serve particular needs. These regional cooperative clusters maximize transurban synergy by various joint ventures and common programs, apart from their national governments.

This brief overview of the salient points of the NICE indicates the existence of a strong active global TUN. The selected social, economic, and political highlights given above reflect the importance of INCs in the EGO. On that basis, we can now move to a more systematic classification of these phenomena.

1.3. TAXONOMY

Having juxtaposed the conceptual and perceptual aspects of our subject-matter, we now complete the diagnosis by a formal definition and classification. As such, we propose that an INC is a complex and dynamic civil center strongly connected to the TUN. This definition combines both internal and external aspects of urban stocks and flows.

Utilizing the traits indicated in our sociophysical model, an INC or weltstadt is characterized by its SET (space-existence-time) parameters. This means that a world city must have a strategic location and a historic evolution, as well as a complex-dynamic social system. These attributes are particularly reflected in the last trait which is concretely translated as:

-Seat of Political Power as state Capital (Controller).
-Center of Economic Wealth and Market place (Producer).
-Focus of Cultural heterogeneity and Quality of Life (Consumer).

As such, the city is a logistic node, combining decision-making, exchanging, transporting, transforming, distributing, storing, as well as entertaining, educating, creating, and inumerable other activities.

Consolidating the plethora of functions into the above criteria, we have devised an operational ICI (international city index) whose specific measurement reflects the coexistence of foreign and domestic structures in a geographical, historical, and social context. A complete description of these indices is given in the tabulation below.

INTERNATIONAL STATUS CRITERIA

1. GEOGRAPHY: Relative Global Situation.
    1.1. POSITION: International Exposure & Strategic Location
    1.2. LOCATION: Configuration & Distance from other World Centers
    1.3. CLIMATE: Weather; Rainfall; Temperature; Seasonal Variation.

2. CHRONOLOGY: Evolution & Potential of Current Events
    2.1. HISTORY: Evolving Development Highlights & Milestones
    2.2. ACTUALITY: Regular Major Activities: Fairs & Conventions
    2.3. POSSIBILITY: Probable Trends; Alternative Scenarios.

3. SOCIOLOGY: Urban Community Working & Living. Customs & Duty Free.
    3.1. ECONOMY: Trans-National Corporation Headquarters.
        3.1.1 COMMERCE: Trade Center; Export-Import.
              INDUSTRY: Building; Engineering; Technology.
        3.1.2 FINANCE: Foreign Investments; Taxation.
              BANKING: Capital Flows; Stock Market.
        3.1.3 SERVICES: Transfer of Technology; Exchanges
              EXPOSITIONS: Trade Fairs; Conventions

    3.2. SOCIETY: Multiethnic Population. Human Mobility.
        3.2.1 TRANSPORTATION: Direct Links with Foreign Countries.
              COMMUNICATION: External channels & Mail Links
              MIGRATION: Movements; Tourism & Leisure; Hotels.
        3.2.2 MASS MEDIA: Publishers; Reputation Electronic/Print
              ASSOCIATIONS: Clubs; INGO's; Professions; Unions
              CULTURE: Art; Museums; Galleries; Music; Theater.
        3.2.3 EDUCATION: Schools; Foreign Students; Universities.
              HEALTH: Hospitals; Clinics; Research; Medicine.
              WELFARE: Services; Shelters; Protection; Refugies.

    3.3. POLITY: Paradiplomatic Institutions; IGO's. Port of Entry.
        3.3.1 REPRESENTATION: Foreign Actors-Consulats Locally
              RAYONEMENT: Municipal Actors-Offices Abroad
        3.3.2 INSTITUTIONS: Supporting & Strategic Services Network
              LEADERSHIP: Elected & Appointed Officials; Civil Service.
        3.3.3 INSTRUMENTS: Cooperation Agreements & Networks
              ACTIVITIES: Exchanges; Twinning; Congresses

These criteria may be applied in intensive or extensive studies of world cities. Operationalizing to such depth or scope, however, is beyond the capacity of this article. Unfortunately, quantification and implementation requires an inordinate amount of time and work, so it could not be carried out here. Instead, we resorted to an abridgement which although not as accurate gives a good idea of reality.

Since an INC, by definition, must be a salient point or intersecting node in the global TUN; the importance of a city is measured not merely by the size of its social institutions, but by the strength of its international connections which varies from bilateral trans-border ties of which there are many thousand, to multilateral international webs of which there are only a few hundred.

This is particularly evident in federations such as USA, Germany and Canada, where local governments are represented abroad separately from their federal governments. For example, more than half of US and Canadian provinces have established over a hundred permanent foreign offices in two dozen countries abroad, in addition to their federal embassies or consulates.

On that basis, INCs may be classified according to the quality and quantity of their connections, because it is they that reflect power, wealth and influence in a world scale.This connectivity can be measured by its lines of transportation and channels of communication.

As a simplified operative index for INCs, the number of resident population, air lanes and diplomatic representation could be chosen. In that case, INCs may be classified in the following three groups:

City	Society	Economy	Polity	Points	%
Global	10 million	50 connect	100 consulates	160	5
Continental	5 "	25 "	50 "	80	15
Regional	1 "	10 "	" 25 "	35	80

The above table estimates that about 5% of INCs top the list in the global category, 15% fall in the middle continental level and 80% in the last regional category. Accordingly, our diagnostic thesis that there exists a TUGS, structured around a strong TUN, whose basic units are some 100 INCs.

The information presented here points to an overall NICE consisting of strong connections and heavy flows of MED among these INCs. The various criteria utilized and indices devised confirm our tentative diagnosis of the present situation, thus defining our universe of discourse. The next step in our agenda is to find an explanation for this situation and thus give some meaning to this important phenomenon.

ITA DIAGNOSIS

Contemporary intercity traffic consistently tends to move from land and sea to air. As a result, land and sea lanes are increasingly being replaced by air lanes as the main channels of international passenger and mail traffic. For this reason, we selected ITA as the most salient ICIndex of NICE.

Accordingly, airports have replaced seaports as the main centers of international people-post traffic. Although ACI (Airports Council International) in Geneva claims over a thousand members, hardly half have multinational connections. Of these international airports (IAPs), only 200 may be considered major because they serve key cities and capitals of the 75 member states of ICAO and handle over a billion and a half passengers each year. These major IAPs, served by over 200 IATA airlines, of which 130 are scheduled, have by now become the status symbols of worldly urbanity.

So much so that the possession of an IAP is considered as the minimal qualification of an INC. On this basis, IAP traffic and ITA connections become the operational index of TUN. The most authoritative and complete census of IAPs comes from ICAO, whose statistics serve as givens for this quantitative analysis. Moreover air traffic information is the only UN data disaggregated by city, rather than country, thus serving our purpose here perfectly. The Appendix lists the top hundred of these IAPs, and hence INCs in 1990.

On the basis of total activity, two thirds of the world's IAPs are in North America, handling 40% of its air traffic, followed by Europe with 20% and Japan with 10%. Of these, the top twenty in 1990 were: Chicago; London; New York; Hong Kong; Dallas; Los Angeles; San Francisco; Tokyo; Atlanta; Miami; Washington; Frankfurt; Seoul; Paris; Honolulu; Osaka; Boston; Toronto; Rome; and Madrid. By 1995, the top ten in total number of passengers were: Chicago 67 million; H. K. 60; Dallas 56; London 55; L.A. 54; Frankfurt 38; Seoul 31; S. F. 36; Paris 28; Boston 25.

Since we are not particularly interested in total traffic, but in its international portion, the relevant data is presented as a fraction (international/total). The tabulation in the Appendix shows the great differences in the volume of intercity connections and aircraft flights, as well as passenger, freight, and mail traffic. These figures indicate the distribution of TUNS, not only in its air connections, but in other respects which are discussed later on.

The main point here is that IAPs serve as the terminal points for the transportation of news, goods or people, between an integrated network of over 10,000 individual city pairs. Total air traffic has now passed the billion mark of passengers or two trillion passenger-kilometers per year flown by the world's 250 airlines. Of this traffic, about one third is international and the rest domestic. In contrast, international air freight of 170 billion ton-km is twice as large as domestic.

Combining five critical indicators, a single standard indicator was assigned for each city to show its internationality. The ICIndex, reflects an INC's number of international connections (C) and flights (F'), as well as passengers (P), freight (F") and mail (M) carried per year, by the formula:

$$ICI=[C+P+M+0.1(F'+F")]$$

On that basis, each of the top 100 INCs obtains its comparative numerical index ranging from 1 to 400 points; meaning that the top INC (London) is almost 400 times as active as the bottom (Strasbourg).

Diagram 1.3 illustrates the resulting hierarchy. In this scheme, INCs are grouped vertically in three classes (A: upper 20, B: middle 30, and C: lower 50) and horizontally in five continents (Europa 38, America 25, Oceania 12, Asia 15, and Africa 10).

It is evident that Europe has by far most INCs, followed by America, whereas Africa has the least, with Asia and Oceania in the middle. In particular, the EC leads with 25 INCs, followed by USA with only 10; other political units never contain more than three. This inequality is strengthened when INCs are grouped by level. The 20 high class INCs are only found in Western Europe, North America, and Pacific Oceania, whereas most of Afro-Asian INCs belong to the 50 low class category.

The picture emerging from this tabulation clearly shows the absolute and comparative position of these 100 INCs. In different degrees, the world is in effect dominated by them. International affairs are no longer the exclusive jurisdiction of sovereign states focused in their capitals, since only 65 of INCs are capital cities. Important centers of socio-economic power share transnational influence by the weight of their stocks and flows.

The hundred INCs cited in the Appendix have the highest indices of material, energetic and informative connections, thus they are the most dynamic centers of the global TUN. Of course, these INCs are not all equal. From the given data, it is easy to see the great discrepancies among these INCs. Since the scale is semi-logarithmic, the differences between each rank are much greater at the top (10-75) than at the bottom (1-3).

Accordingly, the top ten INCs of Western Europe alone total almost 2000 points, followed by the other top ten with 1500; whereas the 30 middle INCs have 1500 and the bottom 50 just over a 1000. Of all these, the EC has 35% (Germany 9%, Britain 7%, France 6%) of the weight, followed by 13% for the USA and 5% for Japan. No other country comes up to more than 4% of the grand total of about 6000 points for the 100 INCs.

This information is tabulated below, showing the ICIndex of the 65 countries where the 100 INCs belong. By this taxonomy a country is as good or influential as the number and weight of INCs it contains. It should be noted that capitals of powerful countries (e.g. Washington, Moscow, Berlin) are not necessarily that important. Nevertheless, a powerful country must have a sufficient number of INCs to qualify. In this sense, the weakness of Russia is quite evident.

INCINDEX	NO	RANK	COUNTRY
26	2300 12	0	EC
10	750 1	1	USA
7	550 1	2	GERMANY
4	450 1	3	BRITAIN
4	350 1	4	FRANCE
2	300 1	5	JAPAN
6	600 3	6	ITALY; SUISSE; HOLLAND
6	600 4	7	BELGIUM; CANADA; HONGKONG; SINGAPORE
11	700 7	8	SPAIN; DENK; BRAZIL; AUSTRA; KOREA; THAI; INDIA
50	1700 45	9	29 Europe;22 America;9 Pacific;12 Asia;10Africa
100	6000 65		38 Europe;25 America;12 Oceania;15 Asia;10Afric

Accordingly, we have distinguished ten national levels. Apart from the EC-12, with 26 cities and 2300 points which is in a class by

itself, the ranking begins with: 1) USA, with 10 INCs and over 750 points 2) Germany (550), 3) Britain (450), 4) France (350), 5) Japan (300), 6) 3 countries of 200 each, 7) 4 countries of 150 each, 8) 7 countries of 100 each, and finally 9) the rest 50 countries with less than a 100 each.

From the above INCINDEX, it is evident that the wealthy world dominates the global TUN with the greatest number of INCs: 20% of the all the countries have 70% of the weltstadts. More important, these hundred cities are tightly interconnected, forming a single interdependent system of planetary proportions.

2. ANAGNOSIS

Trying to explain a particular phenomenon, one has to go behind the appearances to discover its causes. In doing so, we engage in anagnosis or reading of the past chain of events which led to the present situation. Since a historical analysis is unavoidable in order to understand the findings of social diagnosis, we have to know the situation of the old in order to appreciate the NICE.

Although the beginning of civil and international affairs date back a few millennia, widespread urbanization barely began in modern times, attaining explosive proportions only during the present generation. These macrohistorical milestones reflect certain revolutionary breaks in the evolution of human settlements and require a plausible explanation.

Our anagnosis here follows the same method as the previous chapter: i.e. we start with a conception of the topic, follow with a perception of its background, and end with the resulting explanatory hypothesis.

2.1. ETIOLOGY

Sociological theories attribute urbanism to various factors. Weber's seminal study of urbanization, based on a Spencerian theory of growth, showed that cities are the spatial reflection of the natural evolution of economic differentiation and changing division of labor. From another perspective, Braudel likened cities to transformers which accelerate the rhythm of social activity and recharge human energy.

Still a different point of view was given by the World System paradigm of Wallerstein which explains urbanization in Marxist terms as a result of imperialism and uneven center-periphery growth. Since the supreme functions of capitalism are banking, insurance, and investment, the capitalist city becomes the headquarters of global corporations which exploit the Earth's countryside.

Keeping these theories in mind, our explanation is based on the theory of Sociophysics which elaborates relevant metaphors among the physical, organic, and social domains. Accordingly, INCs may be thought of as atoms, molecules, or elements in the structure of the global nervous system. This system is interconnected by the synapses among the dendrites of these urban cells, thus initiating and communicating messages, as well as transporting matter and energy, all of which activate or animate the world.

A similar sociophysical metaphor sees centripetal (gravitational attraction of mass) and centrifugal (circular repulsion of motion) as the basic drives of urban dynamics. These two opposing forces create the Pulsating City phenomenon where concentric ripples of expansion and consolidation alternate each other over time. This circular-cumulative causation principle correlates natural and social forces in a dynamic interaction through space and time.

More specifically, the following factors tend to determine INCs:
¥ Natural: environment & geography: space, resources, climate, centrality.
¥ Historical: Tradition & duration: time, evolution, development.
¥ Social: Human intentions & group dynamics: wars, wants, views.
Since we are here particularly interested in the social aspects of urbanity, we concentrate on the combination of the following factors:
-Political: government policies & security; taxation; legislation.
-Economic: market & production forces; wages, labor, capital.

-Cultural: local character & life style, creativity, leisure.
All these forces which may be correlated in the following function:
INC=f (p, e, c),
This formula stipulates three social requisites for INCs:
-Political Transnationalism (p): competition, federalism, balance of power;
-Economic Interdependence (e): trade, investment, mobility, specialization;
-Cultural Superubanization (c): education; communication; liberalization.
Indeed, in the last generation three megatrends led to the present TUGS:
Political Informalization: liberal deregulation; subnational decentralization;
Economic Internationalization: market globalization; multinationalization;
Cultural Informatization: technological specialization; telecommunication.
It is the dialectical synthesis of these intranational, international and transnational trends that produce INCs and their TUN.

As a wealth-creating process, urbanization multiplies human efforts because of its synergism. That is why urban productivity, production and income are 2-5 times higher than rural. Up to a point, productivity correlates with urbanity: i.e. the larger the city, the more productive it is and the greater value added to its products. Because of their higher rewards, factories attract workers from the farms. Consequently, cities contribute more taxes to the national wealth and subsidize the rest of the country. At the same time, however, per capita expenses rise with urban size, because of escalating infrastructural and service costs, thus necessitating higher taxes.

As a result, it may be said that urbanization is driven by the desire to balance three kinds of social value:
-Cultural: Maximize interpersonal-internatural contact (Effervescence);
-Economic: Minimize the efforts needed to attain results (Efficiency);
-Political: Optimize the benefits of mutual protection (Effectiveness).

Perfect balance, however, is rare. Most likely, various imbalances occur which ultimately produce social change in three areas:
-Cultural: Population explosion & densification;
-Economic: Mass Production & industrialization;
-Political: Legitimate control & communication.

The interaction of these social aspects and their feedbacks produce the combined effect leading to INCs. Conversely, the growth of international relations (transport, communication, migration) increases human conglomerations (economic, political, cultural). This leads us to the dual hypothesis that international activity is the foremost determinant of urban development, just as urbanism correlates with internationalism.

2.2. HISTORY

As a species, homo sapiens is a million years old, but its latest mutation originated in Africa after the latest glaciation period a hundred thousand years ago. Most of the following ninety thousand year period, as humanity spread throughout the Eurasian continent, its growth rate was very slow. By the end of the Paleolithic Age and the beginning of the Agricultural Revolution ten thousand years ago, it was

less than ten million. Since then, population grew much faster to a hundred million in the next 5000 years of the Neolithic Era. This rapid growth rate of 1% per annum, paralleled the permanent settlement of land urbanization and plant cultivation.

The first human settlements were slowly built before10000 BC in Eurasia by bands of less than 100 people each. Towns, however, first appeared around 5000 BC with the literate civilizations of the Near East. Since then, literacy and urbanity became closely correlated. If we index the information available 2,000 years ago as one, then it took until the Renaissance for it to double. It was only at the beginning of this century that it had quadrupled to 8 units. Since then, the information explosion multiplied that index some hundred fold, so it is now over 2000 units.

Similarly, urban history spans about five millennia, between 3000 BC, when the first cities were consolidated and 2000 AD when half the world became urban. It can be confidently stated that no cities existed before the 4th millennium, and that no more than 30 million people lived in cities before the 19th century. Thus it took 5000 years for humanity to reach 250 million, less than 2000 years to attain its first billion by the turn of the 19th century, and merely 200 years to add five more billion.

The number of human settlements throughout history have been estimated to be about 20 million, of which a million are in ruins; four million have disappeared altogether, and the rest 15 million are still functioning. Ancient cities like Aztec Tenochtitlan, Inca Cuzco, Carthagenian Cartago, no longer exist, whereas other old cities like Hindu Benares, Moslem Mecca, and Christian Jerusalem, still serve their original purpose. Most extant cities however are much younger.

In spite of short term ups and downs, the long term urban population has been increasing, especially in the last two centuries. For example, ancient Athens at its peak had about 200,000 people, medieval Athens shrank to little more than a village of a tenth its former size, whereas modern Athens grew to over ten times as populous.

Between 1500-1700, the top ten cities of the world were all in Europe. In the 18th century, Cairo, Bombay, Peking, Moscow, and Constantinople were added. By the beginning of this century, only ten cities had over a million people (London, New York, Paris, Berlin, Chicago, Philadelphia, Tokyo, Vienna); whereas by now there are twenty such megalopoles.

Urban surfaces, as well as populations, have been expanding over the centuries. The first urban settlements were a fraction of a square km. Athens at its peak was hardly 2 sq.km. Alexandria, a few centuries later was nine. Rome at its glory was less than 15 and Constantinople reached 20. Contemporary cities are much bigger: Athens is 150 sq.km. Paris is more than 1000. Tokyo more than 2000. Moscow is almost 4000, and London almost 7000, whereas N.Y. is over 10,000 sq.km.

This urban expansion is always and necessarily at the expense of the natural environment. Urbanization claims over 5,000 square miles of land per year, so that in the last 20 years FAO estimates that 100,000 sq.mi of good farm land have been lost to the cities, half of that in the Third World.

As a result, the distances between cities are shrinking. Intercity travel used to be long, difficult and hazardous. For most of history, a day's journey on horseback was about fifty kilometers which was the average distance between human settlements. This speed of transportation only increased with the railroads in the 19th century and finally the airplanes in the 20th. As centralization and

urbanization went together, fewer and bigger urban centers became the evolving historical tendency.

Historically, the majority of the world's largest cities developed as ports near bodies of water. Those that did not, constructed channels and other waterways connecting them to the open sea as their gateway to the world. As such, INCs existed throughout history, as cosmopolitan trading centers in strategic locations around the planet.

The rise and fall of historical INCs depended on changing patterns of travel and trade due to technological innovations and discoveries. As land transportation, for example, was developed by railroad, seaports and canals decreased in importance. The decline of such great cities as New Orleans, Baltimore, Liverpool, Southampton, Antwerp, Genoa, Cape Town, attests to this trend.

Similarly, as air transport increased, both ship and rail were eclipsed. By now, only few seaports are also world class cities; the greatest of which still are: Rotterdam, Singapore, Yokohama, New York, and Hong Kong. Although sea trade has increased almost tenfold in the last fifty years, it has also become much more centralized in fewer but larger ships and ports.

The following table lists the international sea-born trade of matter (dry cargo in million metric tons) and energy (wet tanker in million metric tons of coal equivalent) and their average length of haul (nautical miles) in the latter half of this century.

SEA TRADE	1950	1960	1970	1980	1990
MATTER	300	500	1000	2000	3000
ENERGY	500	1000	2500	3000	3500
ALH	3000	3500	4500	5000	5500

It is evident that according to these rounded UN estimates, the harbor cities of the world are connected by lengthening channels of transportation through which an increasing volume of material and flow of energy is taking place. These global figures, of course, do not show that the strongest connections and the heavier traffic is between the north-western world, especially the Trans-Atlantic and Trans-Pacific routes.

Although, heavy and bulk transport is still dominated by land and sea carriers, aircraft have taken over most of human and mail transportation. The number of aircraft, airlines, passengers, freight and mail have on average doubled every decade in the past thirty years, so that now, international long-distance travel and post means flying by airlines.

International passengers alone have increased tenfold in the last generation, from merely 25 million in 1950 to 250 million in 1975, and is expected to double (500 million) by the year 2000. Moreover, their mileage tripled from 700 billion to two trillion pa/ml. During the same time, international trade has doubled its share of the GWP (10% to 20%).

Communication has also increased dramatically, especially in the last generation. In most cases telecommunication traffic, as reported by ITU, has doubled every decade or tripled in 25 years. Thus, all flows among cities point to the strengthening of the global TUN.

Underlying this functional growth is the increase of

institutional structures of the world system, as the following table shows:

Circa	Agriculture	Urbanity	States	IGOs	INGOs
1800	90%	3%	10	0	0
1850	80%	5%	25	10	50
1900	70%	10%	50	40	200
1950	60%	30%	75	125	850
2000	40%	50%	200	400	5000

By now, although 40% of the world is still engaged in agricultural work, less than 10% of OECD population is farming, less than 40% is in factory work, leaving over 50% for various services. Needless to say, most of the non-agricultural labor force live in large cities.

A study of 10,000 Public International Organizations (PIO=IGO+NGO) revealed that 2/3 have their headquarters located in 75 cities. A major index of PIO activity are international conferences. These gatherings occur in major INCs. During the 80s, the number of international conferences almost doubled from 4,000 to 7,000. Of these, about half were held in the top 25 world cities, thus showing the concentration of international decision-making in a few global centers of power.

This sequence of historical development from seaports, via train stations, to airports accreted on the world's civic culture. Like the evolution of organisms, TUN developed from a simple collection of INCs to a complex TUGS. It is evident by now that the stages of increasing maturity and connectivity of weltstadts have been salient points in recent history. Moreover although for thousands of years, increases in activity and connections were moderate; in this century and generation, the explosion of most social indicators, especially transurbanism has marked our time as historically unique. Given these facts and its causes, we can now spell out a theory of transurbanism.

2.3. THEORY

Ideologically, the city has been looked upon either as a den of inequity and evil, or as a center of humanity and civilization. Both views are partly true. Urban life means a high degree of both competition and cooperation, generalization and specialization, progress and decadence.

Most classical philosophers considered urban life to be corrupt, so there was a constant yearning to return to the golden age of nature. Later, Spengler saw a fundamental contrast between urban and rural existence, because civilization uproots man from the soil and eventually deprives him of his original nature. As Maine's Ancient Law put it: the historical march of civilization proceeds from natural status to cultural contract. Modern urban life breaks down biological ties and leads to individualism. Therefore, because they had more time to build traditions, older settlements are more structured and class conscious. On the other hand, lacking the heavy baggage of history, younger cities are more egalitarian and pluralistic.

As the human condition shifts from the primeval struggle with nature to the urbane competition among people, socialization becomes more important. The city setting provides this function of civilizing man. Since it is an artificial construct, it creates and obeys its

particular cultural laws above the general laws of nature. As it develops, the city sucks-in matter, energy and people from the country side, thus creating a gravitational vortex which acts as a strange attractor drawing order from chaos.

This tendency creates massive structures and dynamic processes which, at least temporarily, defy the march of entropy. The implications of this general theory are reflected in Weber's concept of urban community as a complex of social actions (behavior), relations (connections), and institutions (networks). These traits are exemplified in the acropolis and agora, campus and forum, court and guild, fort and temple, casbah and bazaar of the traditional city. The necessary politico-military, ideo-cultural and socio-economic aspects of urban life, symbolized by castle, church and market, thus fulfill the mental, spiritual and material needs of humanity.

Since synoecism is the basis of community life, a city-state must have its own language, government and market. Therefore, the attributes of a viable society are: economic sufficiency; political security; cultural amenity. Out of them evolved the two dimensions of state sovereignty: i.e. vertical: authority (de jure) and power (de facto); as well as horizontal: jurisdiction (internal) and independence (external); which were always concentrated either on city-states or capital cities.

The classical state did not differentiate between polity and society. The demos (people) was also the polis (state), with little difference between public (politics) and private (economics) affairs. Since then, political cycles fluctuated from the patrician to the plebian, with the aristocrats yielding power to the democrats. Tyranny was a compromise between the two, as well as an urban-rural rivalry.

Justinian's corpus juris emphasized Lex Regia as absolute state sovereignty, whereas jus naturale emphasized universal-eternal principles. Eventually, sovereign auctoritas was transferred from dei gratia to vox populi, thus confirming the general tendency towards democratic institutions sharing power somewhat between urban and rural areas.

The modern notion of sovereignty now rests on the image of a common fate reflected in the psychological loyalty of patriotism and the physical power of nationalism. This dual basis led to the modern Hobbesian realism of national sovereign absolutism which contrasts with the Grotian idealism of natural confederal relativism. Moreover, the gap between legal sovereignty and political reality reflects the discrepancy between state independence and market interdependence. Thus, on the one hand there is state jurisdiction and interstate organization (regional bloc or global); whereas on the other, there is individual responsibility (transnational) and collective loyalty (national).

These contradictions may be explained by the ups and downs of macrohistoric cycles which over the millennia have transformed the economic, cultural and political life of cities, while maintaining their most fundamental social characteristics. The famous Kondratiev waves show this urban development since the Industrial Revolution. The first wave urbanized Britain in the first half of the 19th century, the second wave followed in Germany in the second half, and the third wave crossed the Atlantic to urbanize the USA during the first half of the 20th century. We are now experiencing a global wave which spreads urbanization throughout the world at the same time as it weaves a tight planetary network.

From that, we conclude that cities evolved in three stages:

-Traditional Premodern: Fortified enclaves, agricultural trading hubs;
-Transitional Modern: Producing, exchanging, and consuming centers;
-Transactional Postmodern: cybernetic information-communication centers

This evolution is illustrated in Diagram 2.3 which summarizes our sociohistorical anagnosis of the modern urbanity. According to it, the forces of political nationalism, economic industrialism and cultural modernism created the proto-urbanism of two hundred years ago. During the intervening period, political internationalism, economic commercialism, and cultural technologism developed Twentieth century urbanism. We are now beginning a transurban NICE which combines political confederalism and economic informatism to produce the global system of the Twenty-first century.

Moreover, the acceleration of history speeds up the frequency as well as the amplitude of this historical trend, so that what were traditionally long waves become progressively shorter and higher. Whereas historically, it took millennia to evolve small and local changes; more recently, it only took centuries to effect much greater and sweeping changes; and now it takes mere decades to revolutionize the whole world. It remains to be seen how far this acceleration will proceed in the future.

This brief historical review completes our anagnosis and supports our original hypothesis that a TUGS has been evolving in this generation in parallel with world development. Our anagnostic thesis found a strong correlation between the growth of INCs and increasing global superbanization, interdependence and transnationalization.

These developments took place unevenly throughout the world, thereby creating great gaps within and among urban and rural areas. The world has been torn between the agricultural and industrial stages of development, as well as between modern and post-modern urbanization. This widening divergence dichotomizes world society into the advanced TUGS and its backward rural environment, thus opening up various possibilities for the future.

ITA ANAGNOSIS

Transurbanization has been increasing by leaps and bounds in the last fifty years. This impression is confirmed by the collection of ITA data carried out by ICAO since 1960, as summarized in the Appendix. During that time, the reporting IAPs increased threefold, from 85 in 35 states to 250 in 75 states. On the basis of these figures, we calculated the ICI of the top INCs in the three past decades, as shown in the tables below. These snapshots taken of the INC hierarchy in 1960, 1970, and 1980, are a historic testimony of the dramatic growth of TUN in such relatively short time.

The tables are consistent with the 1990 picture given in the last section, therefore they will be discussed in retrospective order. Starting with Table 1980, we see that there are only 90 cities qualifying for top INC status. Moreover, the ICI ranges below 300 points, instead of 400 for 1990. These two indeces in themselves give the first impression of the quantitative and qualitative growth of INCs in the Eighties.

In 1980, about the same number of the top 20 INCs were European as in 1990, and the other half were equally divided between America and Ocean-Asia (Africa is not represented at all at this high level). About the same cities occupied similar ranks with minor changes. So the relative situation at the top remains the same, but the absolute has changed significantly, from 2000 to 3500 points, an increase of 75%.

The relative stability of the top 10 does not continue downwards to the mid-thirty INCs. At that level, there is greater fluidity, with more INCs moving up or down, mainly due to political, rather than economic, factors.

By comparing this historical development with the actual situation, one can see that things both change and remain the same. Although its magnitude keeps increasing and its details vary, the structure of the TUGS remains rather static. Most of the INCs appear in all time frames. Those at the top maintain their position throughout and are pushed upwards by those at the bottom where there is much more fluidity. Here Europe is a net gainer from 8 to 13 INCs, whereas Afro-Asia are net losers from 10 to 6. These changes are more stark qualitatively. Although the total weight of the middle 30 increased from 850 to 1500, Europe increased almost threefold (220-600), whereas Africa not at all.

An even greater fluidity is witnessed in the lower ranks, where vertical mobility is highest. Here some cities of 1980 have dropped out in 1990, but there is a net gain of ten INCs, most of which are found in Afro-Asia. This Third World growth is also reflected in the tripling of its absolute weight (100-330), whereas the total points of the lower class only doubled (500-1000). This indicates that, although there is room for entrance and growth at the bottom, the big grow much faster than the small, thus reflecting an agglutinating tendency in the world as a whole.

When we compare the figures of Table 1970 to those above, the dramatic growth of INCs becomes more apparent. Here the top of the range is only 100 points. Whereas only two INCs (London, New York) could reach such status, within twenty years, ten times as many could. Although the weight of the top 20 increased five times, the identity of these INCs hardly changed in two decades. In 1970, we see almost the same dozen Europeans dominate the picture (450 out of 675 points), with 5 North American and 3 Pacific taking up the rest (170 and 55 respectively).

The middle class 30 show a better distribution of INCs among the continents, with Europe (100) and the Third World (100) having less than half of both cities and points each. Finally, the low class 40 equalize the numbers and weights between Euro-America-Oceania and Afro-Asia with about 20 cities and 50 points on each side.

Over the 20 year period, a total of about the same 100 INCs grew six fold. This increase was mostly (threefold) during the first decade (1000-3000), while it tapered somewhat (twofold) during the second (3000-6000). Most of this increase took place in Western Europe and North America; thus confirming the increasing gap between the First and Third World. Only Oceania with its high vertical mobility is the promising bridge which closes this dangerous hemispheric gap.

When we recede further back in time to 1960, the data is much more incomplete and incomparable. At that time, the first ICAO survey only registered the number of flights, passengers, and cargo from about 50 IAPs. So our ICI formula had to be modified to reflect only these variables. On that basis, some approximate picture can be drawn as shown in the corresponding Table 1960.

The 50 INCs that made it to this tabulation range only between 0.5 and 50 points. In this hierarchy, the three classes are headed by 10 top INCs, about evenly divided only between Western Europe and North America for a total of 240 points, giving them twice as much weight as the other 40. Thus setting the top-heavy pattern which runs consistently to the present.

The mid 20 are completely dominated by 15 European INCs, amassing 75 points out of a total of 90, while America and Africa have nothing at all. Here Hong Kong stands at the top of Oceania, while Tokyo is nowhere in sight. This picture, of course, changes completely within ten years with the internationalization of North American and Far Eastern cities.

Finally, the low 20 are about evenly distributed among European, Oceano-American and Afro-Asian INCs for a total of 20 points. Overall, however, Europe still dominates, both in quality and quantity, with 60% of the total number of INCs (30/50) and ICIs (200/350).

Although these figures are not strictly equivalent to those of the following decades, they are roundly comparable. Thus to total INCs rise from 50 to 100 INCs and from 350 to 6000 ICIs in 30 years, an impressive growth in any terms. More significant is the dozen fold growth of the top 20 INCs from 300 to 3500 points, while at the same time, the bottom 20 increased their ICIs from 20 to 250 points. These comparable growth rates have kept the North-South gap of 12:1 constant, even though it increased from 280 points in 1960 and 3250 points in 1990

Without going into details, what emerges from this thirty year motion picture is the absolute growth of INCs, from 50 to 100, as well as their relative stability, with minor modifications in the TUN. This larger historical view shows the steady evolution of transurbanism, as it is reflected in ICI. It is our contention here that this single index is indicative of many other variables which it subsumes.

3. PROGNOSIS

Having completed the review of present and past, we now take a look into the future. The actual situation and the trends which led to it may be projected foreword to predict some of the possibilities open in the coming years. On the basis of what has been said so far then, we should be able to make some pronouncements about the future potential of NICE.

Extrapolations, of course, are full of pitfalls and should be made cautiously. This is particularly so in revolutionary periods when historical breaks create quantum jumps in social evolution. Our forecasts, therefore, are only tentative and conditional predictions of what might happen in certain circumstances.

The following sections complete the adopted methodology by setting the agenda, discerning recent tendencies, and building alternative scenaria for the foreseeable future. In this way, we ensure the cautious and qualified nature of our social forecasts as indicated below.

3.1. MELONTOLOGY

The forces leading to urbanization: economization, differentiation and specialization, are powerful and cumulative. As Geddes proposed and Mumford seconded, the centralizing factors of the Industrial Revolution forced urbanization two hundred years ago and continued until recently. This cycle has now been completed, so the same forces presently tend to de-industrialize overdeveloped countries, because concentration of matter and energy is no longer necessary. Instead, it is now information that rises as the major determining factor of influence. Thus, from distribution centers, cities became production centers and are now becoming communication centers.

There is a long term decline of the material and energetic inputs necessary for post-industrial economy. Conversely, there is an increase of information and technology inputs. The dominant centers of the 21st century will therefore be only those cities plugged into the global information-communication network. Without such connections, mere size becomes a disadvantage and leads to stagnation and poverty.

The future of urbanization will be influenced by the attraction of existing urban centers to the increasingly popular values of living, working and travelling. These may be classified under the headings of:
-Quality: providers of high enjoyment of life and esthetic environment;
-Activity: promoters of services and quaternary sector growth.
-Mobility: facilitators of flows as transport-communication gateways;

INCs, unlike traditional cities, capitals and ports, which preceded them, will not be determined by geopolitical considerations, so much as by their socioeconomic capacity for competition and accommodation in a dynamic world. Clearly, if a city already has accumulated a history, industry, centrality, and popularity it has certain advantages as well as disadvantages.

It should be clearly faced that social dynamics produce both positive and negative outcomes. Any urban development will thus help some and hurt others. As demographic density increases the need and problems of infrastructure, sanitation, protection, administration, recreation; transportation, urban problems of hypertrophy; overcrowding; scarcity; slums; squatting; congestion; unemployment; crime; conflicts; degradation; and finally ungovernability can destroy the best of cities.

Although, the twin processes of dematerialization of production and delocalization of information have negative consequences for the traditional urban growth, cities will still be necessary as venues of civility and sociability resulting from personal human contact. The combined effect of these contradictory tendencies produce three possible aspects:

-Sururban Implosion: Concentrated density combining luxes and slums;
-Suburban Explosion: Widespread entropy combining malls and sprawls;
-Interban Connection: Dynamic stability combining center and margin.

Summarizing these tendencies, we present Diagram 3.1 which shows three possible scenarios for the foreseeable future. The recent forces of political internationalism, economic multinationalism, and cultural transnationalism have led to the present TUN. A combination of these historical forces can either increase, thereby imploding into the gigantism of superbanization; or decrease, thereby exploding into the entropism of suburbanization. Between these two extreme opposites, there is possible a consolidation of post-modern civilization leading to the cosmopolis of the Twenty-first century. Of course, it is this last option that interests us here, so we will focus on it as our central forecast.

3.2. TENDENCY

During the Agricultural eons, population and urbanization increased at about the same rate. But, since then, during the Industrial era, urbanization accelerated much faster, from less than 5% to more than 50%. The question is: will this trend continue in the new post-industrial age at the beginning of the third millennium?

The urbanites in cities over 5,000 people, as a percentage of the world's total population has been estimated to have grown as follows: 1800=5%; 1900=10%; 1925=20%; 1950=30%; 1975=40%; 2000=50%. During the 20th century alone the urban population of the world will have increased ten-fold from about 300 million to over 3 billion.

This explosive growth added one billion to city populations in the last quarter of the 20th century and three billion in the fifty years around the turn of the century, from under two billion in 1975 to almost five billion or about 60% of the world's population by the first quarter of the 21st century.

During that time, the number of cities over one million doubled: from <100 (30%) in 1950; 200 in 1975 (35%); >400 in 2000 (40%); and 600 (50%) in 2025. As a result, the UN estimates that the proportion of people living in these millionaire cities will increase by more than 50%, most of it in the Third World.

Only fifty years ago, just three cities (New York, London, Shanghai) had over ten million people each. Twenty-five years later, that number tripled; and presently, it is expected to double again surpassing twenty-five by the turn of the century. Obviously, the urban growth rate is accelerating and its doubling period getting shorter.

What is worse, is that most of this growth takes place in the Third World. It is for that reason that UNCHS (Habitat, Vancouver 1976), identified urbanization as a most problematic tendency of the 20th century. If this trend continues, by 2020 the world will have seven billion urban denizens to its one billion rural residents.

By then, over 20 megacenters of over 25 million people each, will be added to the Third World alone, thereby creating a massive underclass of a billion slum dwellers looking for trouble or trying to get out and into the First world. As the gap keeps increasing, high

walls will have to be erected to keep them out, like a reverse Iron Curtain enforcing global apartheid. Only in this scenario the First World will consist of TUGS and the Third World of its marginalized periphery.

Consequently, the contradictions between these fast moving centers and their slow moving periphery will be getting deeper and wider. Rapid social change destroys traditional cultures and creates ephemeral populations. The higher density and motion in and between cities the greater the chances of chaotic behavior, thus increasing the need for stricter control and greater concentration of power.

It is expected however that such rapid urban growth cannot sustain itself indefinitely and has to slow down markedly and then taper off soon. As a result the urban planner will be supplemented by the city manager, the architect by the economist, and the civil engineer by the social worker.

Moreover, new specialized settlements are cropping up in the advanced regions of the world. These technopoles or scientific centers are adjuncts of INCs. As borders become more porous, INCs become more cosmopolitan by upgrading their global connections, at the same time as they downgrade their local relations.

As a result of these developments, inter-city competition as well as cooperation intensifies, so many national and international institutions are set up to deal with the problems and opportunities arising by the changing conditions. Future developments then depend on how well the plans and programs of these institutions are carried out.

In order to foresee what might come ahead, one should know who is involved in this area. Herein we note some of the major cities, nations and IGOs which are preparing to carry out various policy plans. Obviously here, First World cities are at the forefront, with the EC having the most advanced supranational transurban cooperation.

Since 1960, for example, the EC has a union of its Capital Cities to coordinate urban policies in Western Europe. In addition, its Commission has a Committee on Local & Regional Authorities, which along with the Conference of Local & Regional Authorities of Europe (CLRAE), unites 350 representatives annually since the 70's.

Various other city networks operate in Western Europe. INTERREG is a transborder network of the EC which promotes inter-regional cooperation in solving common problems. So is RECITE (Regions and Cities of Europe), as well as PACTE, a Program for European Cross-Border Cooperation.

EUROCITIES is a movement of 30 urban communities. La Commission des Villes had 50 members of medium cities. The Eurometropolis Club has 20 members of key cities, and the POLIS Project unites a network of many Eurocities as well as three EUROGATEWAY cities.

Moreover, the EC, which is by now 60% urbanized, has an Urban Ecology Project as part of its Environmental Action Program. In 1990, it instituted the "Green Charta of Urban Planning." which aims to improve the quality of city life in Europe.

Most recently, the Maastricht Treaty recognized the increasing importance of subnational units by institutionalizing their representation at the supranational level. The new Committee of Regions, modelled after the Economic and Social Committee, has 189 members representing local authorities who now participate directly in shaping continental policies, thus bypassing their national governments.

These far reaching European initiatives have spread to the OECD countries which have a program of the Role of Cities in Sustainable

Development and the Urban Observatory Program monitoring urban indices in the First World.

In the global scale, the United Nations has a specialized agency on urban affairs: the UNCHS. Continentally, UNECE studies urban ecology, among other things. WHO runs the Healthy City Project, with 400 cities in over 25 countries and UNESCO's MAB program includes an Urbanization and Environment section. UNU in 1990 held an international symposium on the Megacity of the Future. Finally, Australia and Japan recently established a scheme to create an MFP (Multi-Functional Polis) for the 21st century.

On the municipal level, the International Union of Cities and Local Authorities in The Hague issued a Worldwide Declaration of Local Self-Government in 1985, emphasizing the right of municipalities to conduct international relations and belong to intergovernmental organizations at their own level.

During the same period, the World Association of Major Metropolises in Paris assembles the municipal governments of 50 cities, with over a million inhabitants each, to meet and consult with each other on their common problems. In its last Congress of Montreal, 1994, it declared the intention to strengthen intermunicipal solidarity throughout the world.

Similarly, the World Federation of United Cities and the International Secretariat for Local Environmental Initiatives in N.Y. also work in promoting transurban relations worldwide. Another major activity is the periodic Summit of Great Cities of the World, where mayors of the largest INCs meet for discussions in an open forum.

More specifically, the club mondial des technopoles, created in Sophia-Antipolis in 1985, is an informal network of science cities, of which there are about fifty in the world by now, promoting their cooperative ventures. Maintaining future development necessitates building up a technopolis as an adjunct to every INC.

All these initiatives point to the increasing interdependence and interactivity of local as well as global affairs, of which the TUN is a structural component. It is to be expected that the global network of INCs will tighten and strengthen in the NICE.

3.3. PROPHECY

From the Boetian Confederacy to the United Nations, many cities and states have tried to form intergovernmental organizations in order to resolve their common problems. Beyond a certain point, what began as an interstate organization becomes a supranational confederation. Thus, the many sovereign city-states of ancient Greece are now urban centers within the single sovereignty of modern Greece. Similarly, many sovereign states of Western Europe are presently uniting to form a single confederal community. Beyond that, the United Nations is moving in the same direction of a World Government, though it still has a long way to go towards that end.

At the same time as this integrating process is going on, ethnic groups and local authorities are clamoring for greater self-determination. This clash between powerful centripetal and centrifugal forces is reflected in the dilemma between local desires and global necessities. Most likely, some form of federalism will resolve this impasse, because it recognizes the right of local authorities to engage in world affairs. Thus it is most suitable to handle complex global interdependence by supplementing high diplomacy with low technocracy, thus blurring the differences between foreign and domestic affairs.

With the increase of global interdependence and the rapid dissolution of national boundaries, the position and role of cities and regions will increase proportionately. Urban dynamics have composite variables based on the comparative advantage of cities. As the world impinges increasingly upon cities, they react directly to protect and promote their separate interests. As long as local authorities feel the need, as well as have the opportunity and resources to affect their environment, they will do so with alacrity and impunity.

The next step of NICE is to devolve more political power to the local level, thus remaking urban citizenship a real decision-making avocation. Only such evolution will effectively combat the widespread anomy and apathy resulting from modern urban life styles. For this to happen, cities will have to be rebuilt physically (economically), psychologically (cultural), and politically (cybernetic).

Schumpeter's process of creative destruction applies particularly well to urban development in the future. So the new requisites of INCs should combine these strategies:

-Political Control: civic security, system stability, law and order;
-Economic Competition: standard of living, deep infrastructure, high income;
-Cultural Cooperation: quality of life, ethnic activity, natural beauty.

The conditions of peace and detente which prevail today increase the margin of maneuver of subnational units and projects them to the inter-national arena. The world-city is increasingly unhooked from its nation-state; its destiny is determined more by foreign factors than domestic. Such city is colonized by international capital which is highly mobile and volatile because it is not under the control of any particular state.

A major adjunct of INC is a satellite technopolis which includes in Miyazakis term a SUN (Science-Urbanity-Nature) complex or green space for grey matter. Such urban centers of scientific research, artistic creativity and natural beauty have become the indispensable attribute of INCs in order to maintain and promote their privileged positions in the cutting edge of an ever changing TUN.

The future appears to favor a network of state of the art infranational production and inter-regional trade, bypassing national boundaries and traditional markets. With increasing freedom of movement (trade, tourism, labor, capital, information) the destiny of cities is primarily a result of global forces and regional reactions to them. Local security and prosperity in a dynamic world system requires a global vision and action. Thus the slogan "think globally, act locally" is rather apt in these turbulent times.

Already, as we have seen, inter-city networks of transport-communication are being developed within supranational communities, bypassing nation-states; although public opinion is still divided as to the propriety of municipal governments getting involved in global issues at the expense of local problems. As these two aspects become inseparable, however, governments at all levels will have to tackle both in the context of their regional reality.

Nation-states, caught in the middle, admit this by creating custom-free enclaves; building duty-free zones; and exempting other extraterritorial areas from their domestic jurisdiction. If current trends continue nation-states will become largely irrelevant by mid-21st Century. Instead, urban regions will predominate as cultural, economic and political centers of power and wealth.

Actually, there is very little national governments can do to

shield their cities from these extraterritorial forces which do not respect national boundaries. Cities are therefore forced to resort to their own devices for protection and projection. As such urban politics will become more important, at the same time as world politics become more significant. The loser in both cases will be the intermediate nation-state.

The real decision-making power of the NICE will most likely reside in an alliance of international organizations and transnational corporations, as well as infranational regions and megalipolitan centers, thus squeezing national sovereignty from above and below. The more humanity acquires technologies which affect all life, the more decisions are spread out to be taken collectively at many levels.

Diagram 3.3 illustrates this situation schematically, by showing the major power foci and influence loci of the TUN in the turn of this century. This global configuration is centered in three gravitational centers, whose cities are the protagonists along its major axis. Revolving around them are the satellite cities of the periphery, which play their necessary supporting roles.

This trilateralism emphasizes that for anything to be done in the EGO, it must have the consensus of European, American, Pacific countries and regions, with their billion citizen-producer-consumers. The three rising continental communities of Europe, America, and Oceania, are based on their urban center competition-cooperation structures and activities.

Since city culture epitomizes the spirit of whole continents and civilizations, the emerging global culture is characterized by its network of global cities which will be the nexus of a multipolar world system. The EGO points to a global social system, supported by a single world public opinion, an integrated transport-communications network, and common society-economy-polity.

The future megalopolis is a city-system converging into a single urban conglomeration. The deindustrialized post-modern city will be primarily a creation-communication-control center, rather than a production one. Time-space convergence refers to the rate at which cities approach each other as measured by the time it takes to travel-communicate among them; this correlates with the cost-space convergence.

Structural change, however, from imperial-industrial to post-imperial-technological era, diminishes the stable and secure middle class, thus increasing the upper intelligentsia and lower proletariat. This creates a Dual City of rich and poor: a professional core and an underclass periphery, with its accompanying conflicts and discrepancies, shrinking opportunities and deepening differences.

The outcome may be increasing class separation, retreat into enclaves, collective powerlessness, and market subordination. Urban, national, global division of labor becomes more acute. Economic development and cultural urbanization are correlated. The EGO, therefore, includes a transnational network of rich urban islands in a rural poverty archipelago.

This prognosis anticipates some historical continuity that will further both the horizontal and vertical expansion of the TUN. According to our prognostic thesis, the NICE will be characterized by a stronger TUGS and tighter TUN, as well as a greater quantity and quality of INCs. The TUGS will thus develop apace, no matter what happens within its INC membership.

In this EGO, uneven development over time and displacement over space will continue to divide human society into the powerful and weak,

rich and poor, fast and slow; dichotomies which will be reflected into both the urban and rural domains. Thus the INCs of trilateral APE (America-Pacific-Europe) will continue to dominate the world, while large parts of the Afro-Asian hinterland will languish in the margins of subsistence.

Most of these INCs will retain their privileged position in the TUN, although their ranking will certainly be altered over the next generation. Without going into details, it is safe to predict that the top INCs will still play their protagonist role in whatever is to come. One can therefore expect that the INCs identified herein lead the world to its postmodern era.

ITA PROGNOSIS

In order to complete the trajectory of historical and contemporary pictures of transurbanization already presented, we are now going to project them into the near future. It has been estimated by ACI that the world top ten airports in 2005 (by passenger volume in millions) will be Hong Kong, Dallas, O'Hare (80 each); Heathrow (70); Los Angeles (60); Frankfurt (50); and Seoul, Logan, San Francisco, Paris (40 each). These giant airports alone will then handle about a quarter of the total passenger traffic of the world 1,000 IAPs.

Overall however, we foresee the 100 top INC hierarchy as shown in Table 2000. This table has been extrapolated from the previous four, thus the ICI scale has been upgraded to range between 10-500 points, indicating the continuing development of TUN around the growing IAP nodes.

By the turn of the century, the top cities of the world will most likely to be the same ones as now. London, Paris, Frankfurt, New York, and Tokyo will still be the Big Five (300-500), with Brussels, Amsterdam, Zurich, Hong Kong and Singapore completing the Top Ten (200-500). These gigantic urban centers will weigh over 3000 ICI points, thereby being twice as heavy as the next ten INCs. As before, Western Europe, with Berlin as its most significant addition, overwhelms the top spots, followed by North America and the Far East. Altogether the upper quintile will share more than half (4500/8500) of all ICI points for that year.

Europe, with the addition of fast-rising Eastern European capitals, still accounts for half (1200/2350) of the next 30 middle class INCs; but the distribution is more even among the other continents. Cairo and Johannesburg are still the only African cities that make it to the middle class.

Finally, the 50 INCs of the lower class present a more egalitarian picture, with their 1700 ICIs being more evenly distributed among all five continents. Nevertheless, Europe and America still head the list with 15 cities each.

Overall, the differences between 1900 and 2000 are the additions of the opening cities of Eastern Europe and the Far East, and the subtractions of African deteriorations. In general, however, the increasing magnitude of TUGS and strengthening connectivity of TUN will outpace world development in every way.

To give a synoptic picture of the entire half century, we present the histograph below which covers the years between 1950 and 2000. In order to do that from the existing data, we extrapolated both forewords to the year 2000, and backwards to the year 1950.

The criterion for these extrapolations is the standard sigmoid

growth curve. This curve begins slowly, but accelerates up to a point before it slows down to a plateau. Since our data registered its highest growth rates in the Seventies, it fitted well in this curse. On that basis, it was possible to extend the given data of the middle three decades to cover five.

As a result, we plotted only the history of some salient INCs as most representative of the trends of the period. Most lines follow the predictable cycle of slow-rapid-slow growth. Even those extraordinary growths, such as Hong Kong, Singapore, and Tokyo obey this formula. Obviously, no system can grow rapidly and indefinitely. Exponential growths are unstable and must taper off, implode or explode.

For that reason, we have predicted a slowing down of INC growth in the Nineties. So far, the global economic downturn substantiates this forecast. Nevertheless, the quantitative and qualitative development of TUN will go on in alternating faster and slower cycles into the next century.

CONCLUSION

Summarizing the argument of this macrosocial system study, one can say that along with the acceleration of history and complexification of society, the EGO is building a TUGS, whose TUN structure is formed by a hundred INCs in a NICE. The ITA case study provides a sufficient confirmation of this thesis. Upon it, we demonstrated the extent of the present condition, its historical precedents and future consequents, thereby allowing not only a description of facts and inscription of ideas, but a prescription of norms. Constructing an appropriate model of transurbanism thus becomes the prerequisite of international policy-making later on.

Although INCs rise and fall with historical, social and geographical changes their structures and functions remain the same serving as nodal centers of heterogenous composition and multifarious action, connecting the channels of substance and transfers of influence throughout the world.

Since, we have here been interested in what happens between rather than within cities, we emphasized the growing inter-city relations in a widening inter-national scale. As a reflection of this transurbanization of the world, these INCs are defined by the extraordinarily high trans-border activities and connections of ITA. More than any previous time in history, large quantities of matter, energy, and data cross-national boundaries. It is significant that most of these flows originate and terminate around IAPs.

As the TUGS strengthens, it may become what Mumford called the Anthropolis of planet Earth. This development complements Lovelock's Gaia Hypothesis, according to which the organic biosphere of planet Earth will acquire the superstructure of an intelligent sociosphere in the TUN of the EGO, thus fulfilling the philosophical dream of cosmopolitanism.

Such ideal, of course, does not imply that everything will turn out all right in the best of all possible worlds. Inside and outside this TUN, there will still be a lot of human poverty, slavery, and misery. But there will also be great wealth, power, and beauty. Social development, as natural evolution, does not favor everybody equally, so time lags and substance gaps will still divide the world into haves and have-nots, as well as know and know-nots.

For this reason, human intervention into natural processes can

both better and worsen the nature of things. Within its widening scope and power, human technology impacts the environment in various ways. Perhaps, the most striking one is the contemporary transurbanization which is changing the face of the Earth for better or worse.

What has been painted here in this transurbanological study then is as rational and real a picture of the NICE as possible, how it came to be that way and where it is likely to lead. Understanding this situation, its historic evolution and social dynamic, should help us minimize any looming dangers, maximize our margin of maneuver, and thus optimize human values.

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